Trend Study 17-26-97

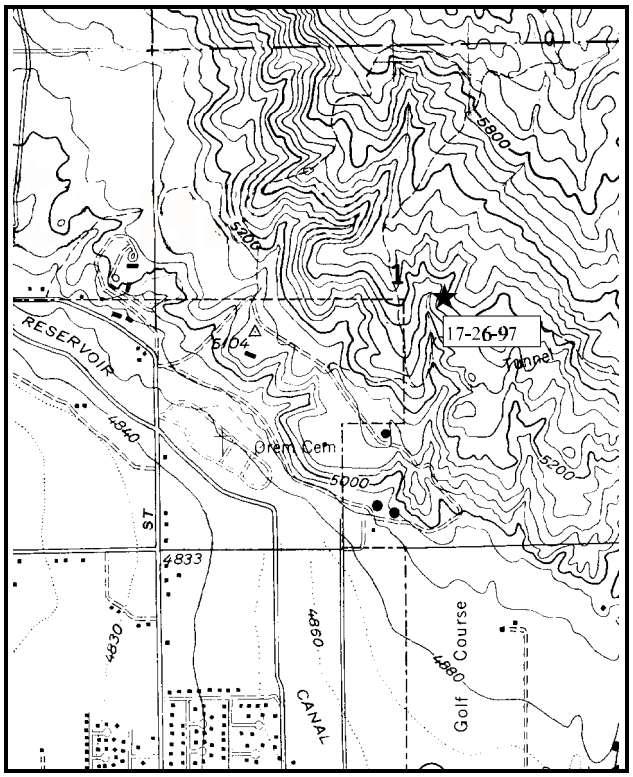
Study site name: Orem Water Tank . Range Type: Mixed oak-saqe

Compass bearing: frequency baseline 38 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

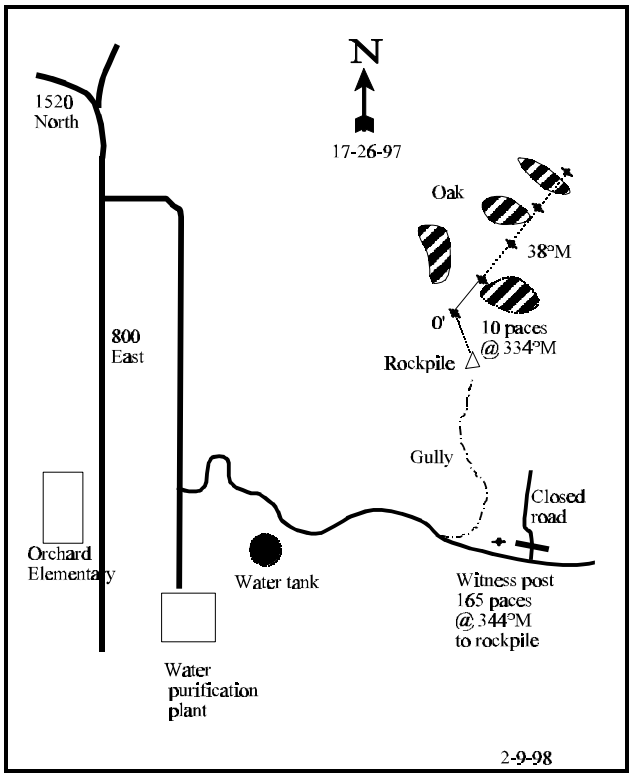
LOCATION DESCRIPTION

On the north side of Orem, go east up 1600 North (which turns into 1520 North) to 800 East. Just south of this intersection on 800 East, turn up the road towards the water purification plant. Go 0.45 miles, turn left and go 0.25 miles to a water tank. Continue on this road 0.25 miles and park. The old road towards the study site is closed, but a witness post should mark the junction. From there walk about 165 paces (275 yards) to a rock pile at the head of a small drainage or gully. From the rockpile, walk north (334 degrees)10 paces to the 0-foot baseline stake at the edge of the oakbrush. It is marked by a red browse tag, #3913.



Map Name: Orem

Township 6S , Range 2E , Section 1



Diagrammatic Sketch

UTM 4464113.885 N, 443685.912 E

DISCUSSION

Trend Study No. 17-26 (19-6)

The Orem Water Tank study is located on burned and seeded oakbrush range immediately north of the Orem Water Treatment Plant. Slope is moderate, ranging from about 12% at the base of the slope to 30% near the top of the slope. Aspect is south to southwest at an elevation of 5,260 feet. Deer use has been heavy in the past, but only light hedging was noted in 1997. Deer pellet groups were fairly frequent with some scattered elk pellet groups as well. Livestock are excluded to protect the watershed. In 1983, grasshopper damage was apparent on the oak, but not enough to impact vigor. In the summer of 1996, a fire burned through the area, eliminating what browse there was with the exception of Gambel oak, which can re-sprout.

Textural analysis indicates a clay loam soil with an effective rooting depth (see methods) of 13 inches. The pH is neutral at 6.7 with an average soil temperature of 58.2°F measured at 14 inches. A dense cover of seeded grasses and litter provides adequate soil protection where 83% of the vegetative cover is from herbaceous species. The 1996 fire has increased percent bare ground, but there is still adequate vegetation and litter cover to protect the soil.

In 1989, it was reported that the Gambel oak stand had changed very little since 1983. Mature oak averaged nearly 4 feet in height and the frequency and density had changed only slightly. Estimated density at that time was 14,333 stems/acre. The fire that swept through the area in 1996 burned all of the oak within the area. No mature plants remained in 1997, with re-sprouting plants classified as seedling or young. These plants average 13 inches in height with an estimated density of 10,560 plants/acre. Unlike other browse species, it is likely that many of the plants classified as seedling on this site will survive to maturity. This population will continue to increase in height and crown but it is unlikely that it will expand at this time. All mountain big sagebrush plants were consumed by the fire and none were encountered in 1997. Previous, its density was estimated at 333 plants/acre. Fourwing saltbush was seeded but not encountered in the density strips. White stem rabbitbrush was encountered with an estimated density of 20 plants/acre.

As reported in the past, seeded perennial grasses (especially smooth brome which is shade tolerant and rhizomatous) continue to be highly successful. Smooth brome is the dominant grass in the Gambel oak understory while intermediate wheatgrass and crested wheatgrass are dominate in the interspaces. Low amounts of annual grass species, cheatgrass, Japanese brome, and six weeks fescue are present but the density of perennial grasses will suppress these annuals from spreading. Alfalfa is the dominate forb at this time. It is healthy and robust, although showing signs of utilization. Other forbs were seldom encountered.

1983 APPARENT TREND ASSESSMENT

Soil trend is improving but is doing so at the expense of plant diversity. Gambel oak and seeded perennial grasses currently are overwhelmingly dominant and threaten to become even more so. From a management point of view, the area provides an abundant, but low diversity diet for deer. Any management action that could increase browse diversity would be welcome.

1989 TREND ASSESSMENT

The perennial grasses contribute significant litter cover, and along with leaf litter from the oaks, provide 92% ground cover. The soil trend is stable. The vegetative trend is down in terms of sagebrush and browse diversity on the winter range.

1997 TREND ASSESSMENT

The soil trend is stable. Although percent bare ground has increased because the recent fire event, there is still adequate vegetative and litter cover to protect the soil from erosion. Gambel oak will continue to grow and provide additional protection as well. It is difficult to assess the browse trend at this time. All mountain big sagebrush plants were destroyed by the fire, but the reading in 1989 estimated only 333 plants/acre. Gambel oak is the key forage species at this time and it will continue to grow in height. Browse trend is stable, although the establishment of other forage species should be encouraged. Herbaceous understory trend is stable with many of the same species present now that were present prior to the fire. Smooth brome will continue to dominate the understory and protect the watershed. Forb diversity is relatively high, although many of the species are in comparatively low numbers.

TREND ASSESSMENT
soil - stable
browse - stable, only oakbrush is available since the fire
herbaceous understory - stable, but dominated by seeded exotic species

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 26

Type	Species	Nested Frequency '83	'89	'97	Quadrat Frequency '83	'89	'97	Average Cover % '97
G	Agropyron cristatum	$_{a}$8	$_{a}$1	$_{b}$41	5	1	14	1.68
G	Agropyron intermedium	$_{ab}$112	$_{b}$148	$_{a}$103	41	52	35	4.96
G	Agropyron trichoporum	$_{c}$61	$_{b}$18	$_{a}$-	27	8	-	-
G	Bromus inermis	$_{a}$235	$_{b}$268	$_{ab}$232	76	83	74	13.45
G	Bromus japonicus (a)	-	-	37	-	-	12	.86
G	Bromus tectorum (a)	-	-	105	-	-	38	2.49
G	Poa pratensis	-	3	-	-	1	-	-
G	Poa secunda	3	7	10	1	3	3	.06
G	Vulpia octoflora (a)	-	-	2	-	-	1	.00
Total for Grasses		419	445	530	150	148	177	23.54
F	Alyssum alyssoides (a)	-	-	101	-	-	43	.73
F	Astragalus spp.	-	2	-	-	2	-	-
F	Calochortus nuttallii	$_{b}$20	$_{a}$1	$_{b}$14	11	1	8	.04
F	Descurainia pinnata (a)	-	-	10	-	-	5	.02
F	Epipactis gigantea	-	-	2	-	-	1	.00
F	Erodium cicutarium (a)	-	-	28	-	-	12	.21
F	Eriogonum racemosum	5	3	5	4	1	2	.03
F	Galium aparine (a)	-	-	6	-	-	2	.04
F	Hedysarum boreale germinale	$_{b}$22	$_{a}$-	$_{a}$-	9	-	-	-

Type	Species	Nested Frequency '83	'89	'97	Quadrat Frequency '83	'89	'97	Average Cover % '97
F	Holosteum umbellatum (a)	-	-	2	-	-	1	.00
F	Lappula occidentalis (a)	-	-	7	-	-	4	.02
F	Lactuca serriola	-	-	2	-	-	2	.18
F	Linaria dalmatica	-	-	3	-	-	1	.03
F	Medicago sativa	$_{a}$14	$_{a}$22	$_{b}$99	7	10	37	12.19
F	Polygonum douglasii (a)	-	-	2	-	-	1	.00
F	Sphaeralcea coccinea	6	8	6	4	3	3	.04
F	Tragopogon dubius	1	-	5	1	-	2	.06
F	Zigadenus paniculatus	1	-	-	1	-	-	-
Total for Forbs		69	36	292	37	17	124	13.64

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 17 , Study no: 26

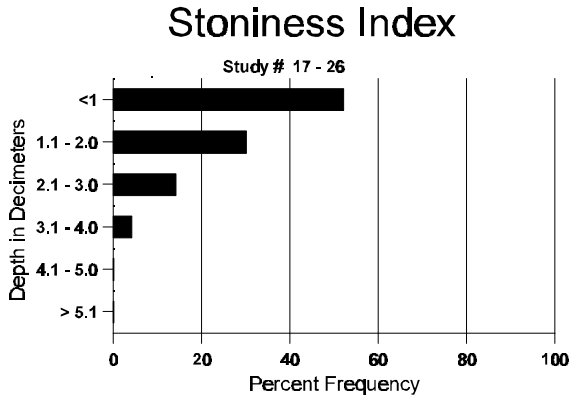
Type	Species	Strip Frequency '97	Average Cover % '97
B	Chrysothamnus nauseosus albicaulis	1	-
B	Quercus gambelii	57	7.65
Total for Browse		58	7.65

BASIC COVER --
Herd unit 17 , Study no: 26

Cover Type	Nested Frequency '97	Average Cover % '83	'89	'97
Vegetation	349	1.50	3.00	42.85
Rock	206	.50	1.00	3.87
Pavement	239	.75	1.00	1.99
Litter	385	95.50	91.50	34.48
Cryptogams	1	.25	0	.00
Bare Ground	307	1.50	3.50	23.51

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 26

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.0	58.2 (14.3)	6.7	33.8	38.4	27.8	2.9	15.9	198.4	.7



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 26

Type	Quadrat Frequency '97
Elk	7
Deer	36

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 26

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	83	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	2	-	-	-	-	-	-	2	-	-	-	133	31	26	2
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	83	-	-	4	-	-	-	-	-	-	4	-	-	-	266			4
	89	-	1	3	-	1	-	-	-	-	2	-	3	-	333			5
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	100%	00%	-17%
'89	40%	60%	60%	Died out
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	399	Dec:	67%	
'89	333		100%	
'97	0		0%	

Atriplex canescens																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16	13	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	None
'89	00%	00%	00%	None
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	0	Dec:	-
'89	0		-
'97	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus albicaulis																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	None
'89	00%	00%	00%	Appeared
'97	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'97	20		-

Gutierrezia sarothrae																		
D	83	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	Died out
'89	00%	00%	00%	None
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	133	Dec:	100%
	'89	0		0%
	'97	0		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Quercus gambelii																		
S	83	21	-	-	-	-	-	-	-	-	21	-	-	-	1400			21
	89	26	2	-	12	-	-	-	-	-	32	2	2	4	2666			40
	97	229	-	-	-	-	-	-	-	-	229	-	-	-	4580			229
Y	83	15	48	-	-	-	-	-	-	-	63	-	-	-	4200			63
	89	117	9	-	9	-	-	-	-	-	132	-	3	-	9000			135
	97	363	-	-	45	-	-	-	-	-	326	74	-	8	8160			408
M	83	-	124	-	-	40	-	-	-	-	164	-	-	-	10933	40	15	164
	89	43	7	-	2	1	-	-	-	-	53	-	-	-	3533	46	19	53
	97	120	-	-	-	-	-	-	-	-	104	16	-	-	2400	13	10	120
D	83	-	-	3	-	-	-	-	-	-	-	3	-	-	200			3
	89	14	11	-	1	-	-	1	-	-	13	1	11	2	1800			27
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	8280			414

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	92%	01%	00%	- 7%
'89	13%	00%	07%	-26%
'97	00%	00%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	15333	Dec:	1%
'89	14333		13%
'97	10560		0%